

Gas Free Engineering Program

**LG
#13**

Background

Confined & Enclosed Spaces

- **Ships have many confined spaces**
 - *Especially tanks & voids*
- **Confined spaces lack ventilation**
- **Toxic gases/vapors may build up**
- **Rust may use available oxygen**

Confined Space- Definition

- **Limited or restricted openings for entry and exit**
- **Lacks natural ventilation**
- **Not intended for continuous occupancy**
- **Examples: Tanks, Voids, Condensers, Reduction gears, and Ventilation ducts**



Enclosed Space- Definition

- **A space where the natural movement of air is restricted**
- **Any space that has been closed without ventilation for 24 hours or more**
 - Examples: Engine rooms, Auxiliary machinery rooms, and Emergency generator rooms

Health and Fire Hazards

- **Lack of oxygen will not support life**
 - *May asphyxiate workers*
- **Toxic gases or vapors may cause asphyxiation or intoxication**
- **Flammable vapors/gases could lead to explosion or fire**
- **Any combination can lead to fatalities or serious material damage**

What Are We Looking For?

□ **Prior to entry, confined or enclosed spaces must be tested for:**

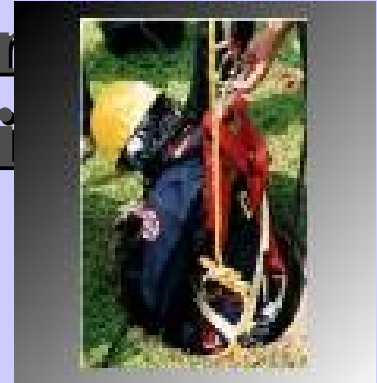
- Lack or excess of oxygen
- Hydrocarbons
- Carbon monoxide
- Carbon dioxide
- Hydrogen sulfide gas
- Toxic vapors
- Upper & lower explosive levels



**B. Gas Free
Engineering (GFE)
Program**

Program Elements

- **Confined/enclosed space entry procedures, including testing**
- **PPE**
- **Ventilation requirements**
- **Emergency and rescue procedures**
- **Instrumentation, including calibration and maintenance**
- **Training of ship's force and GFE personnel**



Other Program Components

- **Every ship must have at least 1 trained, qualified & certified GFE**
- **Sufficient number of GFE Petty Officers trained, qualified, & certified to assist GFE**



Everyone Must Understand

- How the GFE program works**
- Restrictions on confined/enclosed spaces**
- How to request GFE services**
- Procedures for helping a shipmate in an emergency involving confined/enclosed spaces**

More Program Requirements

- All confined/enclosed spaces shall be considered hazardous
- Entry or work is prohibited until spaces inspected, tested, and issued a gas free certificate
- Entry into, or hot work, in fuel related spaces is only allowed with CO permission



More Program Requirements

- **Entry into a space deemed Immediately Dangerous to Life or Health (IDLH) is prohibited under normal operations**
- **Spaces must be cleaned & ventilated before entry to work**
- **Do not introduce toxic, flammable, or oxygen depleting materials during work in confined/enclosed spaces**

C. General Rules and Rescue Procedures

Safety Rules for Confined/Enclosed Spaces

- ▢ **Never work alone**

- ▢ Observer or outside attendant required
- ▢ Communication must be established

- ▢ **Use exhaust ventilation**

- ▢ Even if respirators required and used

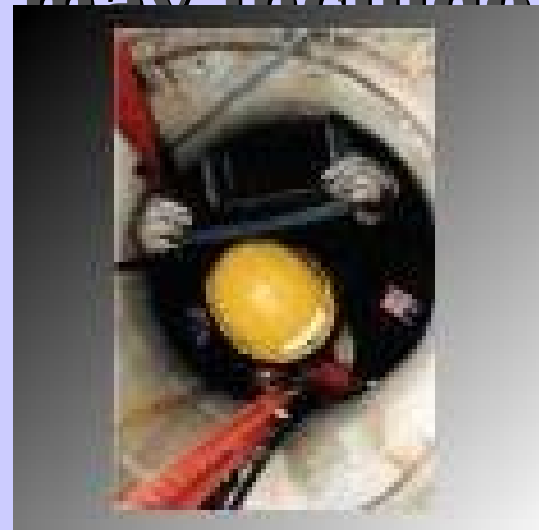
More Safety Rules

▣ **Obey requirements/limitations on Gas Free Certificate**

- ▣ Certificate posted at entrance to space
- ▣ Will indicate conditions in existence at time of testing:
 - NOT safe for personnel-NOT safe for hot work
 - NOT safe for personnel without protection-NOT safe for hot work
 - SAFE for personnel-NOT safe for hot work
 - SAFE for personnel-SAFE for hot work
 - NOT SAFE for personnel INSIDE-SAFE for hot work OUTSIDE

Still More Safety Rules

- ▣ **Gas Free Certificate only good for 8hours**
 - ▣ Testing must be repeated after 8 hours
- ▣ **Wear PPE required by certificate and supervisor, which may include**
 - ▣ Tending lines
 - ▣ Harnesses
 - ▣ Gloves
 - ▣ Goggles
 - ▣ Respirator



Rescue Procedures

- ▢ **NEVER ENTER A SPACE EVEN IF YOU SEE A SHIPMATE UNCONCIOUS IN THE SPACE!!**
- ▢ **Report the incident and wait for help**
- ▢ **Never enter without special respirators and backup assistant**

Note: Many would-be rescuers often become fatalities!

Rescue Procedures

- ▢ **Emergency & rescue control points established before entry**
- ▢ **Rescue attempted from outside only**
 - ▢ *Use tending line*
- ▢ **All personnel assigned space work shall be trained in rescue procedures**
- ▢ **Wear Self-Contained Breathing Apparatus (SCBA) for IDLH atmosphere**

Requesting Gas Free Services

Whether for repairs, maintenance or PMS, personnel have a need to enter a confined or enclosed space request the space be tested and gas freed.

- Contact DCA or fire marshal to arrange for GFE services**
- Gas free certificate only good for 8 hours from time of testing**
 - Make arrangements for retesting if necessary**
 - Certificate can be updated every 8 hours -- after testing**